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ABSTRACT

This paper reports on a study investigating the beliefs of general education faculty, including their assumptions about "typical" undergraduates' approaches to reasoning. The article maintains that in studies designed to identify and examine variables affecting complex cognitive tasks, researchers have discovered that performance often depends on individual epistemological beliefs. In addition a growing consensus is reported that adult reasoning behavior is affected by cognitive developmental patterns that evolve beyond adolescence. The Reflective Judgment Model served as the basis for the study. Seven faculty members completed a questionnaire on courses and students taught, focus of teaching and prior experience as well as the California Critical Thinking Disposition Inventory. The professors were then interviewed by a graduate student regarding their course goals, teaching and assessment methods and kinds of assignments given to students and given a task involving judging reflective thinking levels of typical responses to a problem. The study found that, in general, professors assumed that their students possess epistemic beliefs consistent with the earliest levels of reflective judgment, whereas they view their own approach to reasoning as consistent with the very highest stages. Appendices provide more detail on the measures used and a graphical representation of the results. (Contains 23 references.) (CK)

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Faculty Members' Assumptions about College Students' Reasoning

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Abstract

Research dealing with the epistemological development of young adults has helped college professors understand how their students reason about and resolve ill-structured problems. To date, however, researchers have largely overlooked two important variables: (1) epistemological beliefs held *by* college faculty members themselves; and (2) faculty members' assumptions *about* college students' reasoning. The purpose of this paper is to report on efforts to investigate the beliefs of general education faculty, including their assumptions about "typical" undergraduates' approaches to reasoning. An important outcome of this research is the degree to which it informs a discussion of implications for translating theories of adult intellectual development into effective methods of college teaching.

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An Examination of Professors' Epistemological Beliefs and their Assumptions about the Reasoning of General Education Students

College students face an array of academic and personal problems; it is possible to categorize these problems according to the degree of certainty with which they can be resolved. Well-structured problems are characterized by clear, simple parameters and the possibility of a single, correct answer, whereas ill-structured problems are characterized by complex and uncertain parameters, incomplete information, antithetical arguments, interpretations based on divergent perspectives, and the possibility of multiple solutions (Wood 1983; Kitchener, 1983). Educational and developmental psychologists have concluded that traditional conceptions of critical thinking and cognitive development fail to capture a larger set of reasoning abilities necessary for adults to make decisions in the face of situations that are inherently complex and uncertain. Therefore, more recent conceptions have focused on criteria that are reminiscent of the distinction between well-structured and ill-structured problems. For example, in cataloguing key features of higher order thinking (HOT), Resnick (1987) described HOT as a process that is non-algorithmic, complex, and often yields multiple solutions; it also involves uncertainty, nuanced judgment, and the application of multiple criteria. Looking at this list, it appears that adult reasoning is not only affected by the structure of a given problem; it is also dependent on concomitant characteristics of an individual problem solver.

In studies designed to identify and examine variables that influence higher order thinking on complex cognitive tasks -- for example, reading comprehension and statistical reasoning -- researchers have discovered that performance often depends on an individuals' epistemological beliefs (Schommer, 1990; Schommer, Crouse, & Rhoades, 1992) . These beliefs may exist as independent cognitive dimensions, including beliefs about the certainty and simplicity of knowledge, as well as beliefs about the speed of learning and the role of effort and ability in learning (e.g. beliefs about whether ability is fixed and innate or whether it is mutable and acquired through persistent effort.). Beliefs may also manifest themselves as general intellectual dispositions that influence the willingness of college students to execute critical thinking skills in ill-structured situations (Facione, Facione, & Gainen, 1995). For example, a person may exhibit a strong disposition to be open-minded when it comes to alternative points of view but a weaker disposition to seek truth in the face of evidence that is contrary to his or her beliefs.

Among those involved in discussions about adult thinking, there is a growing consensus that adult reasoning behavior is affected by cognitive developmental patterns which continue to evolve beyond adolescence. Beginning with work by Perry (1970), these patterns have been referred to as post-formal operations (Commons et al., 1990), dialectical reasoning (Baseeches,

1986), and cognitive complexity (Spiro et al., 1987). Each of these conceptions has one element in common, namely that approaches to problem-solving can be distinguished in terms of personal and social epistemologies maintained by young adults (see Greeno, 1989). The notion of a personal epistemology has been described in terms of the general assumptions one holds toward authority and evidence as well as a person's beliefs about knowledge itself (Scheurman, 1995a). The most rigorous theoretical paradigm to emerge from these efforts is the Reflective Judgment Model (RJM; King & Kitchener, 1994). As a psychological construct, reflective judgment is predicated on a three level model of cognitive processing (Kitchener, 1983); *cognition* refers to basic processes -- computing, memorizing, perceiving, etc. -- on which knowledge of the world is built; *metacognition* refers to knowledge about cognitive tasks, about strategies that my be invoked to accomplish those tasks, and about how to monitor one's own progress when engaged in the tasks; finally, *epistemic cognition* refers to processes for monitoring the truth value of alternative solutions. This includes an individual's knowledge and assumptions about the limits, certainty, and criteria for knowing. According to Kitchener (1983, pg. 222), "epistemic assumptions influence how individuals understand the nature of problems and decide what kinds of strategies are appropriate for solving them."

Using an instrument called the Reflective Judgment Interview (1985), the authors of the model have been able to identify a typical progression of epistemic cognitive operations that develop during the college years. Freshmen typically enter college with a dualistic conception of reality in which all problems are considered well-structured and authorities are regarded as dispensers of absolute truth. These students often evolve through stages of uncertainty where multiple opinions are accepted as equally justified. They may eventually adopt a more mature belief that problems are indeed ill-structured and that truth is the product of interpretation within a particular perspective. The Reflective Judgment Model is grounded in constructivist learning theory; the authors suggest that in the final stage, "knowledge is constructed by using skills of critical inquiry or by synthesizing evidence and opinion into cohesive and coherent explanations for beliefs about problems" (King & Kitchener, 1994, pg. 70). The authors also describe the particular relationship between higher stages of reflective judgment and the ability to cope with ill-structured problems (*italics* added):

> The major development of Stage 6 is the recognition that problems that are complexly understood (for example, understanding that a problem can be approached from multiple perspectives, incorporating multiple kinds of evidence) require some kind of thinking action before a resolution can be *constructed* (pg. 67).... Knowledge is *constructed* into individual conclusions about ill-structured problems on the basis of information from a variety of sources (pg. 68).... Ill-

> structured problems that press the individual to look for shared meaning across contexts do exist. Further, those who reason from this perspective assert -- and demonstrate -- that solutions to such problems must be *constructed* rather than simply found (pg. 70).

In summary, a person who reasons at the highest stages of reflective judgment not only exhibits sophisticated critical thinking behavior (e.g. the execution of discrete argument skills) and metacognition (e.g. the ability to invoke an effective strategy at an appropriate time), he or she also maintains a conscious awareness of individual assumptions about thinking and knowledge itself. Furthermore, these epistemic assumptions manifest themselves as dispositions toward thinking and learning that have met rigorous criteria for philosophical justification (e.g. the assumption that people actively search for meaning in their world and that one should be open-minded in the pursuit of truth). A consideration of epistemic beliefs and thinking dispositions is especially relevant when talking about general education college students. General education courses are often taken during the years of transition from high school to college. For most people, this is a time of inevitable confrontation with ill-structured problems.

Although models such as RJM have enhanced our understanding of how college students reason about ill-structured problems, recommendations for translating theoretical knowledge into the practice of general education have been slow to emerge, and where they have occurred, such recommendations have been vague or overly general. There are several plausible reasons for this lack of response on the part of college faculty. First, many faculty members may not be aware of current research on adult intellectual development. Second, they may have failed to sufficiently consider either their own beliefs about knowledge and learning or the personal epistemologies that guide the intellectual habits of their students. Finally, to the extent that faculty have considered student epistemologies, it is also possible that professors have *misjudged* the intellectual maturity of students, leading to false expectations and misguided assignments. In any case, since faculty perceptions influence the curricular and instructional decisions they make every day, it is plausible to claim that professors' epistemological beliefs, as well as their perceptions of students' beliefs, are important variables to consider when discussing the nature of general education. Unfortunately, the extant literature on adult intellectual development shows little attention to these variables. Research that has been reported suggests only that faculty members' understanding of changes among college students are often related more to identity than to cognitive development (Froberg & Parker, 1986) and that faculty members themselves appear to hold a wide variety of epistemological assumptions (Beers & Bloomingdale, 1983).

One researcher confronted the issue of professors' assumptions about students' personal epistemologies directly. Dings (1989) designed a study to answer the following question: Using Reflective Judgment theory as a framework to describe reasoning, what level of reasoning do faculty members associate with their students? Dings developed a Reasoning Description Questionnaire (RDQ), which he administered to 46 social science faculty at a liberal arts university. On the RDQ, professors were asked to provide a rating of how descriptive certain statements were of how their "typical" freshmen and senior students make judgments about controversial issues, as well as how they make such judgments themselves. For example, an RDQ statement dealing with the dimension of authority and corresponding to reflective judgment stage 2 reads as follows:

> Sees authorities as sources of truth and absolute knowledge.
> "Dr. Jones knows all about these things. If I wanted to know, I would ask her; then I'd know what to believe."

An example of a statement corresponding to stage 6 reads as follows:

> Considers reputable experts as knowledgeable sources who can make more informed judgments than non-experts. Carefully evaluates their judgments as the basis for making a reasoned but tentative decision about an issue.
> "The fact that Dr. Jones has come to this conclusion doesn't make it true, but it does give it extra credibility in my mind."

Several results emerged from this study (see Figure 1): (1) a large number of faculty *underestimated* the cognitive complexity of freshmen students (they considered stages 1 and 2 most representative of their "typical" freshmen students, whereas research shows averages for freshmen around 3.6); (2) in general, faculty tended to *overestimate* the reasoning of senior students (they rated stages 5 and 6 as representative of "typical" seniors, whereas averages have hovered around 4.0); (3) faculty clearly saw differences between students' reasoning and their own, rating themselves almost exclusively at the highest levels of reflective judgment. These findings were consistent across three separate dimensions of reflective judgment (the role of evidence and authority in making judgments and the nature of knowledge). To date, this study has not been replicated, nor have the results been tested using means other than the Reasoning Description Questionnaire. Furthermore, implications of Dings' research have not been sufficiently discussed.

[Insert Figure 1 about here]

Against this background of theory and research, the goal of the present study was to enhance our understanding of faculty members' epistemic orientations and to examine the nature of their assumptions about college students' reasoning. A second goal of the study was to use results for making specific methodological recommendations relevant to undergraduate general education.

Methods

This study extended existing research in three important ways. First, although a small data set was used (n=7), a large measure of rich qualitative data was obtained. It was hoped that this information would provide either corroborating or disconfirming evidence to claims made by Dings (1989). Second, the study of faculty assumptions was broadened to include critical thinking *dispositions* held by faculty members, as well as their perceptions of students' dispositions. Finally, we wished to consider a major pedagogical concern, namely how (if at all) faculty seek to promote reflective judgment in undergraduate general education. Therefore, the study was designed with an eye toward translating theoretical and empirical conclusions into practical and generalizable recommendations for undergraduate general education.

Research questions

The specific research questions guiding this study were: (1) what is the nature of college professors' epistemological beliefs (specifically, what conceptions do general education faculty hold toward critical thinking and reflective judgment); (2) what assumptions do faculty members hold toward their typical students' reasoning capabilities and approaches; and (3) how do professors' beliefs and assumptions influence professors' efforts (or lack of efforts) to facilitate the development of critical thinking dispositions and reflective judgment skills among their general education students?

Data source

Seven faculty members agreed to serve as participants. Each of the professors teach undergraduate general education courses at a public, liberal arts university with an undergraduate enrollment of 5000. The faculty represented a range of experience (from 1-33 years teaching general education) and academic domains (agricultural science, art, chemistry, English -- one literature and one composition -- philosophy, and resource management). These individuals, five men and two women, were involved in a faculty development workshop called *Thinking About Thinking: A Constructivist Approach to Critical Thinking in the College Curriculum* (see Russo, Scheurman, Harred, & Luebke, 1995). Faculty members read and discussed King & Kitchener's (1994) book, Developing Reflective Judgment, discussed research completed during this project, considered recommendations for fostering reflective judgment in the college years, and revised lesson plans for their own general education courses. These workshop activities occurred AFTER all data was obtained; therefore, participants' responses were not influenced by a specific intervention related to critical thinking dispositions or the Reflective Judgment Model. However, since they had volunteered to participate in the faculty development workshops, our initial

expectations were that these people would be more interested and knowledgeable in the topic than the "typical" university professor.

Instruments

Background Questionnaire. Each faculty member received a questionnaire to complete before being interviewed by a graduate student. The questionnaire was designed to gather general information on courses and students taught by each professor, focus of teaching, and prior experience, including background knowledge in critical thinking and reflective judgment.

California Critical Thinking Disposition Inventory. Faculty members also received the CCTDI (Facione & Facione, 1992), an assessment of individual dispositions along seven dimensions. We paid special attention to the *Maturity* sub-scale since it is conceptually very similar to reflective judgment. The CT-mature person is described as one who

> ... approaches problems, inquiry, and decision making with a sense that some problems are necessarily ill-structured, some situations admit of more than one plausible option, and many times judgment must be made based on standards, contexts, and evidence which preclude certainty (Facione et al. 1995).

Two other sub-scales were especially relevant given our focus on Reflective Judgment: *Truth-seeking* captures the disposition to honestly seek the best knowledge even when findings do not support one's preconceptions, beliefs or self interests; and *Open-mindedness* captures a tolerance for divergent views and sensitivity to the possibility of one's own bias. Representative items from each of these scales are presented in Appendix A.

Interview. Approximately two weeks after receiving the Background Questionnaire and CCTDI, the seven professors were interviewed by one of two graduate students. Interviews were conducted in the office of each faculty member and took approximately 30 minutes. The interviews were tape recorded and later transcribed.

The interview focused on the goals of general education as well as the specific goals of professors' courses, teaching methods used to accomplish such goals, kinds of assignments given to students, and methods of assessing student achievement. Each faculty member was asked if he or she would share copies of syllabi, assignments, activities or projects, and methods of evaluation. Faculty were also asked to define "problem solving" and "critical thinking" and evaluate whether, based on their definitions, they felt they engage their students in such activities. Finally, they were asked to discuss major barriers they face in accomplishing their goals in general education.

Members of the research team (two professors and three graduate students) read the transcribed interviews and discussed their content on several occasions, looking especially for general patterns concerning the relationship between professors' thinking and their perceptions of students' thinking. Decisions and categories were arrived at by consensus.

Approaches to Thinking Sorting Task. At the end of the formal interview, the graduate student administered an *Approaches to Thinking Sorting Task* (Scheurman, 1993) to each professor. For this task, participants were presented the following ill-structured scenario, which is patterned after the form of problems presented on the Reflective Judgment Interview (1985):

> *There is a continuing debate about what is the best way to teach reading. Some people argue that a phonics (or code-oriented) approach is better, while others prefer a whole language (or meaning based) approach. Both sides of the issue have been supported by researches, teachers, school officials and parents.*

Professors were then given fifteen one-paragraph responses to the problem and instructed to place three in each of five piles ranging from "least to most reasonable" (samples of the responses are in Appendix B). These responses were counterbalanced by length (short, medium, long) and by stand on the issue (pro, con, neutral). Each statement represented an approach to the ill-structured problem that is prototypic of reasoning at one of five different stages of reflective judgment. These prototypic responses were patterned after a modified version of the Reflective Judgment Interview called the *Prototypic Reflective Judgment Interview* (see Kitchener, Lynch, Fischer, & Wood, 1993), except that stages one and two, as well as stages six and seven, were collapsed into a single set of three statements. There were two reasons for collapsing stages: first, the extremes of the model bear strong conceptual similarities; and second, research has shown that few people at any age exhibit approaches to problem solving that can be characterized as either stage one or stage seven.

After sorting the responses, faculty were instructed to explain, in essay form, how the statements in each pile shared a general approach to thinking, as well as what they perceived as the general trend across piles.

Follow-up Activities. Approximately two weeks after the initial interview, faculty were presented with a follow-up activity to the *Approaches to Thinking Sorting Task*. On this modified version of the task, professors received the identical problem and statements they received before. However, on this administration, the fifteen prototypic statements were presorted according to Reflective Judgment Model criteria. Thus, three statements prototypic of reasoning at stage one/two (collapsed) were grouped, as were three prototypic of stage three, and so on. The

five piles of statements were presented to professors on a continuum from "least reasonable to most reasonable" (participants were not told how they had originally sorted them). On this version of the task, professors merely identified the presorted pile that most accurately portrayed their own thinking as well as the one they perceived to be most representative of their "typical" general education student's thinking. Once again, they explained their perceptions in writing.

Also two weeks after the interview, immediately before the start of the first workshop, professors completed the CCTDI a second time. This time, however, they were instructed to respond to each item as though looking through the eyes of their "typical general education student." Professors were not allowed to view responses from their first encounter with the CCTDI, at which time they had taken the survey through their own eyes.

Results

Background Questionnaire

Six of the seven professors reported that their general education courses were comprised mostly of freshmen. Using a forced choice format, three professors reported that their primary focus in general education classes was teaching "a body of knowledge and/or set of concepts," two reported it as "a mode of inquiry and/or set of interrelated values," one as " skills and/or a set of procedures," and one as "dispositions and/or the formation of a set of beliefs." Five of the professors had never heard of Reflective Judgment theory, two had heard of it, while none regarded themselves as "very familiar" with it.

Critical Thinking Disposition Inventory

The results of the disposition inventory are summarized in Figure 2. A score of 40 on any subscale is considered a benchmark, above which students are thought to exhibit a propensity for maintaining that disposition see (Facione et al., 1995). The middle line represents the "average freshman" (norms were established during previous studies at similar institutions). The top line shows the mean responses of the seven faculty when speaking for themselves, and the bottom line represents the faculty's mean responses when asked to complete the inventory through the eyes of a "typical general education student." As Figure 2 shows, faculty members *underestimated* the sophistication of students' dispositions toward critical thinking. It also reveals the marked gap that exists between faculty dispositions and the perceptions they have of their students' dispositions. These findings were consistent with the results of Dings' (1989) study using a Reasoning Description Questionnaire.

[Insert Figure 2 about here]

Approaches to Thinking Sorting Task

Scores on the *Approaches to Thinking Sorting Task* were obtained by computing a correlation between faculty rankings of prototypic statements and the rankings "keyed" to reflective judgment criteria. In a previous study in which this task was employed, college students who received "epistemic training" (workshops designed to apply reflective judgment criteria in ill-structured situations) exhibited an average correlation of around .80, whereas students who did not received such training exhibited correlations around .50 (Scheurman, 1993). The mean correlation of faculty members in this study was .81 (median = .77), which, along with numerous explanations for why statements were sorted as they were, suggested that these professors had an intuitive grasp of Reflective Judgment theory and how students' personal epistemologies affect their approach to ill-structured problems. For example, one professor summarized the pattern of responses in this way:

> ... from least reasonable being those who already know the truth based on narrow personal experience to most reasonable being those who recognize that the truth tends to be "more truthful" when put into context and [who] realize that multiple truths need not necessarily be contradictory (that they can actually co-exist even in the same context).

In short, faculty members sorted protocols into piles that were relatively consistent with stages of reflective judgment, even though most of them had neither read nor heard about the Reflective Judgment Model (RJM). We also noticed an interesting trend among professors to explain their rankings in terms of domain-related criteria. For example, an English professor selected as more reasonable those statements that were written in "the impersonal, rather passive professional style" simply because this style was "more recognizable" than one using "informal syntax and vocabulary." A Chemist, on the other hand, confessed that she was looking for a "scientific way of thinking," one that "comes up with conclusions ... based on observations." Finally, a Philosopher selected statements that accepted the authority of a single expert (actually considered LEAST reasonable by RJM) as more reasonable than those that left truth up in the air since they at least assumed a minimum "criterion of truth" (i.e. an expert view), whereas those who were willing to wait until experts divulged the truth at a later time were exhibiting a "defeatist" attitude.

Figure 3 shows the frequency of responses on the *Approaches to Thinking Follow-up Activity*. Although not quite as pronounced as it was on the second administration of the CCTDI,

the pattern of *underestimating* the capabilities of students was once again apparent. Two faculty chose stages 1 and 2 (collapsed into one pile), two others stage 3, and three others stage 4 as representative of their students' reasoning (recall that previous research suggests average levels of thinking among these students is stage 3.6). However, the perceived "gap" between faculty and student reasoning was very pronounced, since all but one faculty member indicated their own approach to thinking as best represented by the highest pile (prototypic of stages 6 and 7). Professors clearly believe that their own approaches to ill-structured problems are significantly different than the approaches of their general education students.

[Insert Figure 3 about here]

Interview

Several interesting patterns emerged from the initial interviews. Most faculty members expressed frustration at institutional barriers preventing opportunities for critical thinking; foremost among these were concerns about too much content and too little time. Although this was not surprising, it was interesting to notice what professors saw as the byproducts of this problem. For example, the chemistry professor observed that "the time required to come up with new ways of teaching is considerable; very often, I'm preparing for my lecture an hour before it's due -- I don't have time to come up with a new way of thinking, a new way of devising a scheme to get them to think about the material." This professor was even more specific in her assessment of the problem, commenting on how the nature of the discipline received short shrift in general education courses: "because of the quantity of materials we're required to get through and because of the skills that they need to know, periodically we're reduced to using particular methods, a series of steps that are required to balance a chemical equation." In other words, although she did not articulate this problem in the precise terms of personal epistemology, her comment could be restated in this way: *we reduce ill-structured problems to well-structured problems in order to accommodate the constraints of time and material.*

Another interesting observation about the interviews with faculty was that in spite of their recognition of institutional barriers, many of the participants placed ultimate blame on themselves (collectively). Furthermore, these frustrations were often expressed in terms that spoke directly to aspects of reasoning described by the Reflective Judgment Model. For example, the Chemistry professor provided a stage two kind of lament, claiming that "students are very willing to accept the teacher or the book; this is the way we have trained them." Without identifying it as such, the philosophy professor also struggled with issues of adult intellectual development, citing his interaction with students who exhibit classic RJM stage 4 reasoning: "what I try and convince the kids of is that they don't even believe that one person's opinion is just as good as any other's opinion; I mean, they can mouth that, but the very fact that they argue with their friends shows that

they don't believe that." Unfortunately, this professor's description of how we deal with students who are reaching to modify their epistemic beliefs revealed his concern that his own efforts were not enough: "when it comes round to defending their own positions ... we give them four minutes for writing argumentative essays, a very law-schooly kind of approach ... [to] try and fulfill the General Education requirement of ... prodding people to live the reflective life....We think this is the means of achieving the larger goal."

Other faculty members made statements that *implied* shortcomings in the way they were teaching; however, it was often not clear whether they were entirely conscious of what those shortcomings were. For example, an Art professor did not appear to see a discrepancy between asking students to "give me what I'm looking for" (one of her implicit goals in teaching) and the fact that they seldom exhibited what she would regard as higher order thinking. Similarly, an English teacher who described his attempt to elicit "choral responses" from students seemed to be motivated by a goal of having students master lower order knowledge (expressed through recitation) while simultaneously admitting that students "didn't like to think."

Still other professors recognized shortcomings in general education, and even seemed to have a sense of how to address them, even though they lacked a sense of efficacy about what they could do. For example, a professor of Natural Resources confessed that important discussion topics are usually left for "senior" classes since the demands of content require "lecture only" in freshman classes. Finally, a veteran Agricultural Science professor proclaimed, "I feel very strongly that we have to do something, because I just don't see a sparkling eye in a lot of students who we simply go in and talk to for fifty minutes."

In general, it was our sense that most of these professors believe their major responsibility, *at least during the first two years of general education*, is to convey a specified amount of content in a particular domain. This seemed to be a source of frustration for most teachers, who lamented the constraints of time and coverage and wistfully discussed their desire to make general education "something more." One professor became quite animated about an important project that calls on students "to act on an environmental issue." Interestingly, when he realized that he had drifted from his discussion of "freshmen, general education" courses to upper division courses, he revealed (perhaps subconsciously) a concern about *where* such exercises should occur in the curriculum: "Oddly enough, in my senior level class -- there's a lot more writing in a senior level class -- where they're responding to broad kinds of questions, ... [they] have the responsibility to write a *good* paper, to be willing to question." Another professor said that "perhaps we don't spend enough time to give students a chance to really pursue some of the alternatives." Finally, one faculty member confessed that "I like to talk, and I probably do too much time doing that. I need to let students talk more than I do in my class, especially Freshman English."

A final pattern of responses we identified among initial faculty interviews centered around misconceptions and contradictions about development and developmentally appropriate instruction. This observation was based on a high frequency of comments concerning student apathy toward thinking, coupled with an apparent struggle among faculty to explain the roots of this phenomenon. For example, one professor listed the major barrier to accomplishing his goals in general education as "what I perceive as apathy -- which may not be apathy, after all, ... [but] fear that they don't even know how to go about asking me to help them .... Some of them are just unprepared for what they get into here, ..., they're not ready for what we're expecting them to do...." The interesting feature of this explanation is that the teacher seems to be aware that what he perceives as apathy is actually a condition of students trying to avoid situations and problems that stretch their intellectual capacities. Although others were more explicit in their claims about apathy, they sometimes revealed implicit contradictions in their perceptions of students' unwillingness to engage in critical thinking. Consider this English professor: "...most of my freshmen really do not like to talk, and the kinds of material I teach are not always discussible, like, I'm simply passing on information ... that [isn't] a very interesting topic of discussion." Comments like this suggest that faculty were *implicitly* aware of their own inability to sufficiently challenge students, or worse, they were aware of boring students with too much information too early in their college careers. However, these professors were persistent in offering student apathy as the *explicit* explanation for the learning and motivation problems among students in their general education classes.

Discussion

The purpose of this study was to examine the personal epistemologies of general education professors, including their assumptions about the reasoning abilities of "typical" undergraduates in general education courses. The results of the study corroborated previous findings, namely that college professors tend to underestimate the intellectual maturity of "typical" students in their own programs. This study also extended earlier research, showing that professors sell students short when it comes to perceptions of students' dispositions toward critical thinking, and also when it comes to the specific approaches employed by students when confronted with ill-structured problems. In general, professors tend to assume that their students possess epistemic beliefs consistent with the earliest levels of reflective judgment, whereas they view their own approach to reasoning as consistent with the very highest stages. These results suggest several implications for the way we teach general education.

The most important implication is reflected in the self-fulfilling nature of comments made by faculty. Consider this quotation from one of the initial interviews, which serves to summarize many of the patterns we observed among faculty responses:

> I think we still tend to use that old philosophy.... We are the knowledge; they are seeking knowledge, so we are to convey our knowledge to them as quickly and as efficiently as we can without giving ... ample thought to questions like "do we need to do this much," "how much should they be doing on their own," and "if we can guide them to a point, can they take over and move ahead?" I don't think we do enough ... analyzing of what we should be doing with these students. And I think we're awfully traditional in what we do in many of our general studies courses.

In theoretical terms, this professor seems to be saying that we are not expecting the intellectual maturity of students to be very high -- indeed, not as high as it actually is. If this is the case, then perhaps professors' perceptions of student apathy and boredom are actually the result of having failed to sufficiently challenge the students. To "simply give them information and ask them to go on and basically solve [a] problem" (which the professor just quoted said was the basic approach to problem solving in his introductory classes) is to reinforce the false notion that all problems are well-structured and that knowledge is at best discrete and simple and at worst dualistic (right or wrong). In short, if faculty assume general education students are operating at RJM stage two, then they will teach them accordingly. Since many students are actually ready to be challenged with problems and activities that require higher levels of reasoning, they will respond with justifiable apathy. Professors may, in turn, become frustrated and reduce expectations even further. Looking at the data in light of this potential self-fulfilling mindset, we concluded that three specific conclusions were warranted at this time.

First, apathy among students was among the top concerns cited by the professors we studied. However, it is plausible to argue that what professors perceive as apathy and boredom might actually be a matter of students' intellectual immaturity (just tell me what I need to know). Second, to the extent students are actually apathetic, their apathy could be fueled by professors who capitulate to an underestimated view of students' intellectual maturity. After looking at interviews, syllabi, assignments, and tests, it appears that professors in this study, perhaps unintentionally, often reinforce a dualistic view of knowledge. Furthermore, they give short shrift to ill-structured problems in their undergraduate general education courses. This may contribute to what we interpreted as a self-defeating cycle for undergraduate faculty. Underestimating student dispositions and levels of reflective judgment leads professors to expect little from students by way of higher order thinking; students deliver on these expectations and give professors "what they think they want," and professors in turn become frustrated at what appears to be high levels of student apathy.

A third conclusion of this study involves the extent to which statements made by professors reflect pervasive dispositions toward students and general education. It appears that while faculty

may wish to view themselves as "stage 7" reasoners, they often treat students in ways that are consistent with the lowest levels of reflective judgment. Furthermore, we concluded that the near future looks grim, not only for many general education students, but also for many of the professors who serve them. Several faculty members expressed intentions to continue transmitting information in beginning classes, with real efforts to promote critical thinking reserved for senior students and above, even though this mode of operation concerned them. After repeatedly hearing comments revealing a pervasive lack of teacher efficacy to change the way we approach undergraduate general education, one cannot help thinking that if professors don't have time to "come up with new ways of thinking," how can we expect students to? There were, of course, exceptions to this pattern. For example, the philosopher spoke passionately about the need for rigorous examination and argumentation as well as the importance of developing a healthy skepticism, and one of the English professors devoted much of the interview to a discussion of the "processes" of thinking and writing rather than the "product" of knowledge in the domain. Unfortunately, these professors appear to be in a minority. Furthermore, whereas these two faculty members were less disenchanted than their colleagues over issues such as time allowed for coverage of content, they were nevertheless frustrated at the persistent intellectual naiveté displayed by their younger students.

In summary, research on the intellectual development of young adults has contributed to our understanding of how college students reason in ill-structured situations. Fortunately, recommendations for college teaching based on knowledge about students' epistemological orientations have begun to emerge (see King & Kitchener, 1994; Scheurman, 1995b). Unfortunately, many instructional decisions continue to be made by faculty who have given little thought to the ill-structured nature of adult problems or who see higher education as a place where knowledge is merely transmitted from authority to novice. Especially with increasing numbers of non-traditional students entering general education programs, faulty assumptions about the reasoning capabilities of students can lead to curricular decisions that are as developmentally inappropriate as decisions made without attention to students' epistemologies at all. As in the Dings' (1989) study, the findings presented here "raise questions about how educators arrive at assumptions about students' reasoning skills, how they translate these assumptions and expectations ... into assignments and grading criteria, how students understand these expectations, and whether and how discrepancies between educators' assumptions and students' skills are addressed" (King & Kitchener, 1994, pg. 169). Given recent interest in constructivist theories of learning, answers to these questions seem essential if general education is to resume the degree of influence and effectiveness for which it was once noted. It is hoped that the discussion presented in this paper is a step toward providing such answers.

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Appendix A

Descriptions of three sub-scales and sample defining items included in the California Critical Thinking Disposition Inventory (Facione & Facione, 1992).

Sub-scale	Description	Sample items
Maturity	Prudence in making, suspending, or revising judgment. An awareness that multiple solutions can be acceptable. an appreciation of the need to reach closure even in the absence of complete knowledge	• The truth always depends on your point of view. • We can never really learn the truth about most things. • The best way to solve problems is to ask someone else for the answers.
Open-mindedness	Tolerance to divergent views, self-monitoring for possible bias.	• It concerns me that I might have biases of which I'm not aware. • I shouldn't be forced to defend my own opinions. • It's important to me to understand about what other people think about things.
Truthseeking	A courageous desire for the best knowledge, even if such knowledge fails to support or undermine one's preconceptions, beliefs or self interests.	• It's never easy to decide between competing points of view. • I look for fact that support my views, not facts that disagree. • Being impartial is impossible when I'm discussing my own opinions

Appendix B

Sample prototypic responses to ill-structured problem from Approaches to Thinking Sorting Task, with corresponding Reflective Judgment Model stage.

Pile #1 (RJM stages 1-2)

I know for certain that whole language instruction is the best approach to reading because I read about the issue in my educational psychology text. In fact, I have never known anyone from a meaning-based reading background who wished they would have learned to read in a different way. Of course, companies that publish phonetic instructional programs are paid to say that phonics is a better approach. This may lead some people to believe that phonics is better than whole language, but they have probably not encountered the knowledge that I have. They are wrong to challenge the whole language approach until they have considered the facts available on the issue.

Pile #2 (RJM stage 3)

It seems to me that phonics approaches are better than whole language approaches to reading, but this is one of those things we just can't be certain about right now. Although there isn't much proof on either side, the situation is only temporary and teachers should not become discouraged. Educational researchers are investigating the issue, and we'll eventually know for sure whether phonics should replace whole language altogether. In the meantime, people can believe what they want about the best way to teach reading. Since authorities in the field have not yet discovered the best way to teach reading, I advocate sticking to traditional methods, including code-oriented instructional programs.

Pile #3 (RJM stage 4)

Without the resources for a completely thorough study, it is virtually impossible to know which approach to reading instruction is better. There is some evidence supporting phonics, but a large constituency of teachers still favors whole language. We can't get inside the head of children and find out what they are thinking, so what people believe about the issue is likely to depend on the kind of training they received when they were young as well as the experiences they have had with reading. Given my personal background, it is just too uncertain to make a decision one way or the other on this issue. However, people from a different background have the right to maintain a different position.

Pile #4 (RJM stage 5)

There is evidence on both sides of the issue, and it is unlikely we can ever know without a doubt. On the one hand, research has shown that skilled readers decode segments in words, which argues for phonics. Parents often look at the quick, visible results of phonetic instruction and decide it is best. Other evidence, however, suggests that the context of a word is most important. From a teacher's point of view, understanding words in context is often more important than just saying words, which would make whole language the preferred choice. People look at evidence differently because of their own perspective. Since teachers are responsible for insuring that children learn to read, I lean toward the whole language method of instruction.

Pile #5 (RJM stages 6-7)

Experts tend to agree that skilled readers rely more on an awareness of phonics to decode words, whereas less skilled readers rely more on context to establish meaning of words. Since these claims are based on educational research, it is important to consider the assumptions and methods used in each study. It is also necessary to compare this kind of evidence with arguments based on theory or personal experience. In the case of reading, whole language has some positive features, but the potential consequences are simply too great to abandon code-based instruction in favor of a program that has not been adequately tested. New evidence can always lead to a different conclusion on such complex issues; for instance, it may turn out that phonics and whole language are not incompatible with each other. In light of the evidence we have, however, it is more justified to encourage expertise through phonics instruction.

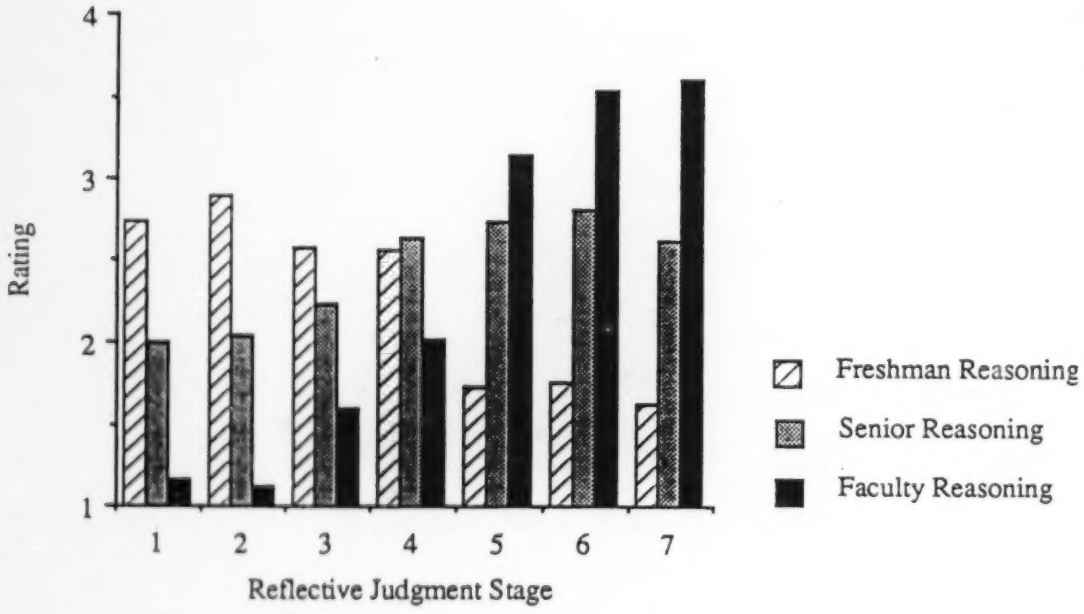


Figure 1. Composite faculty ratings by educational level on the Reasoning Description Questionnaire (Dings, 1989, with permission).

Note. The ratings are based on this scale: 4=very descriptive; 3=fairly descriptive; 2=slightly descriptive; 1=not descriptive. Dark colored bars represent faculty members' average rating of their own level of reflective judgment; lightly shaded bars represent average rating of senior students' level of reasoning; cross-hatched bars represent faculty members' average rating of freshman students' level.

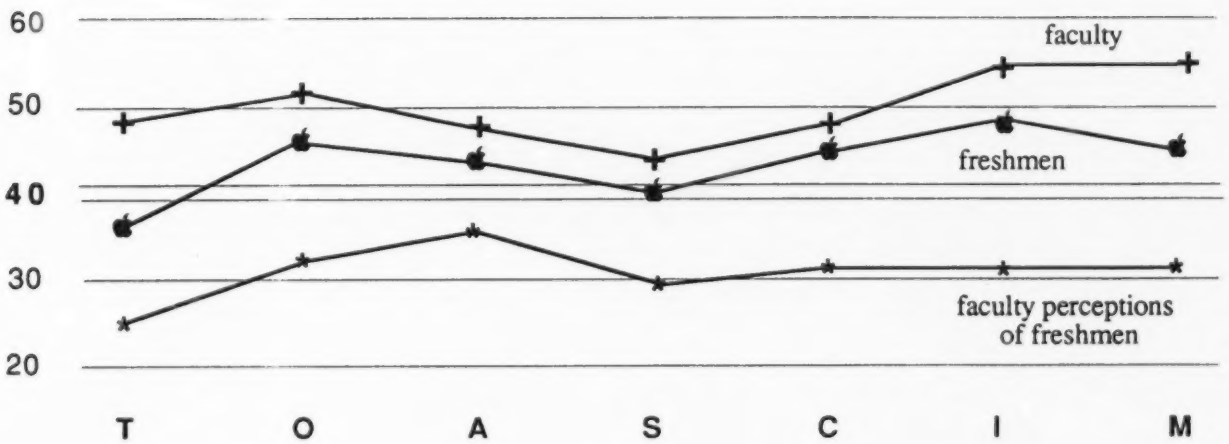
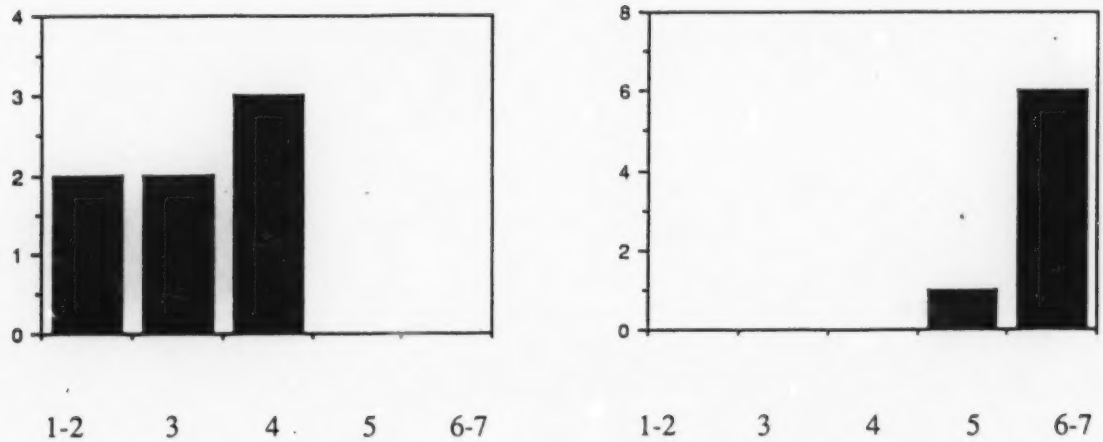


Figure 2. Profile of scores on the California Critical Thinking Disposition Inventory (Facione & Facione, 1992).

Note. Top line = average responses of faculty members; middle line = average responses of freshmen students; bottom line = faculty perception of "typical" general education students' responses. Disposition subscales include: **T**=truth-seeking; **O**=open-mindedness; **A**=analytical thinking; **S**=systematic thinking; **C**=confidence in own thinking; **I**=inquisitiveness; **M**=maturity (see Facione, Facione, & Gainen, 1995).



A. Reflective Judgment Stage B. Reflective Judgment Stage

Figure 3. Frequency of responses on Approaches to Thinking Sorting Task.

Note. Histogram A = frequency of statements selected by faculty as representative of typical students; Histogram B = frequency of statements selectedby faculty as representative of self.